———. *The culture of the northeastern Indian hunters: A descriptive survey.* In: "Man in Northeastern North America," Papers Robert S. Peabody Foundation for Archeology **3**: 263–271. Edited by F. Johnson. 1946.

GORHAM, R. P. *The history of plum culture in New Brunswick.* Acadian Nat. **1** (2): 59–69. 1943.

HALLOWELL, A. I. *The size of Algonkian hunting territories: A function of ecological adjustment.* Amer. Anthrop. **51** (1): 35–45. 1949.

JACK, EDWARD. *Maliseet legends.* Journ. Amer. Folk-lore **8**: 193–208. 1895.

LOOMIS, F. B., AND YOUNG, D. B. *On the shell heaps of Maine.* Amer. Journ. Sci., ser. 4, **34**: 17–42. 1912.

MAILLARD, A. S. *Account of the customs and manners of the Micmakis and Maricheets:* 138 pp. London, 1758.

MATTHEW, G. F. *Discoveries at a village of the stone age at Bocabec, N. B.* Bull. Nat. Hist. Soc. New Brunswick **1** (3): 5–29. 1884.

MCINTOSH, WILLIAM. *Aboriginal pottery of New Brunswick.* Bull. Nat. Hist. Soc. New Brunswick **6** (2) art. 2: 110–120. 1909.

MECHLING, W. H. *Maliseet tales.* Journ. Amer. Folk-lore **26**: 219–258. 1913.

———. *Malecite tales.* Can. Geol. Surv. Mem. 49 (Anthrop. Series no. 4): 133 pp. Ottawa, 1914.

SPECK, FRANK G. *Malecite tales.* Journ. Amer. Folk-lore **30**: 479–485. 1917.

———. *Bird-lore of the northern Indians.* Bull. Univ. Pennsylvania **21** (18): 349–380. 1921.

———. *Reptile-lore of the northern Indians.* Journ. Amer. Folk-lore **36**: 273–280. 1923.

———. *Penobscot man:* 325 pp. 1940.

SPECK, FRANK G., AND DEXTER, RALPH W. *Utilization of marine life by the Wampanoag Indians of Massachusetts.* Journ. Washington Acad. Sci. **38** (8): 257–265. 1948.

———. *Utilization of animals and plants by the Micmac Indians of New Brunswick.* Journ. Washington Acad. Sci. **41** (8): 250–259. 1951.

SPECK, FRANK G., AND EISELEY, L. C. *Significance of hunting territory systems of the Algonkian in social theory.* Amer. Anthrop. **41**: 269–280. 1939.

SPECK, FRANK G., AND HADLOCK, W. S. *A report on tribal boundaries and hunting areas of the Malecite Indian of New Brunswick.* Amer. Anthrop. **48**: 355–374. 1946.

STAMP, HARLEY. *A Malecite tale: Adventures of Bukschinskwesk.* Journ. Amer. Folk-lore **28**: 243–248. 1915.

TREAT, J. *Etchemins.* Archaeologica Americana **2**: 305–367. 1836.

WATSON, L. W. *The origin of the Malecites.* Journ. Amer. Folklore **20**: 160. 1907.

WISSLER, CLARK. *The relation of nature to man as illustrated by the N. A. Indian.* Ecology **5** (4): 311–318. 1924.

PALEONTOLOGY.—*Stratigraphic range of the ostracode genus* Phanassymetria *Roth.*[1] I. G. SOHN and JEAN M. BERDAN, U. S. Geological Survey. (Communicated by John B. Reeside.)

The genus *Phanassymetria* was established by Roth (1929, p. 358) for two species of ostracodes from the Haragan marl (Lower Devonian) of Oklahoma. In 1936 van Veen (1936, p. 177) discussed this genus and assigned to it two species from the Upper Cretaceous of Holland. As has been noted by Kellett (1943, pp. 626–627), this created a surprisingly long range for the genus, and because other species from intermediate periods have not been recorded, it appeared desirable to review the generic characters of both the Lower Devonian and the Cretaceous species. We have been fortunate in having van Veen's paratype material for study, as well as Roth's types from the Haragan marl, and have observed morphological differences between the Lower Devonian and the Cretaceous species. In this paper the genus *Phanassymetria* is limited to those forms occurring in rocks of Silurian and Devonian age, and a new genus is established for the Cretaceous species.

We are grateful to Drs. G. A. Cooper and David Nicol, of the U. S. National Museum, for arranging the exchange of van Veen's paratype material through Dr. J. H. van Voorthuysen, Geologische Dienst, Haarlem, Holland, and for making available Roth's types. Dr. R. A. M. Schmidt, of the U. S. Geological Survey, prepared the radiographs used in illustrating this paper, and her cooperation is gratefully acknowledged. Mrs. Elinor Stromberg prepared the illustrations. We also wish to thank Dr. Kurt Rosenwald and Mrs. Severine Britt for assistance in translating the quoted portions of van Veen's discussion of *Phanassymetria* from the German.

MORPHOLOGY OF OSTRACODE SHELLS

The most recent discussion of the shell structure of ostracodes is that by Sylvester-

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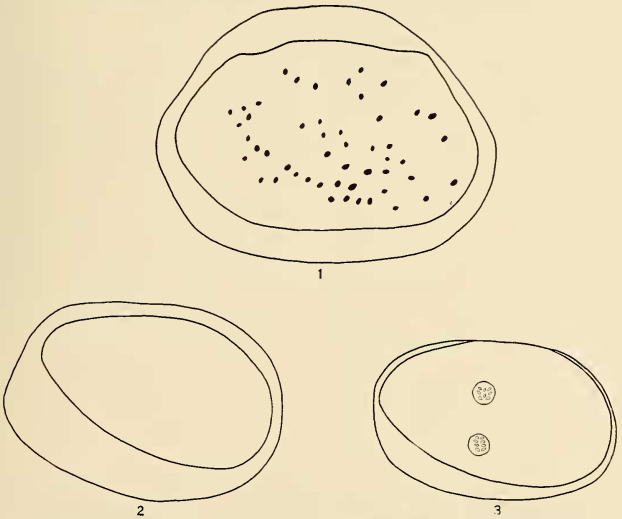
Bradley (1941, pp. 1–33). The valves of living ostracodes are pierced at right angles to the surface by pores known as "normal pore canals," from which hairs protrude. In general, these pores are not recognizable on Paleozoic ostracodes, although they can be observed on many post-Paleozoic forms.

Swartz (1936, p. 581) described the early Paleozoic genus *Tubulibairdia* as characterized by "coarse tubular pores which open on the internal surface of the valves, but do not reach the exterior." The same type of pore occurs in the Paleozoic species of *Phanassymetria* (Fig. 1) and in other Paleozoic genera. If the tubules are normal pore canals they should be present in all the genera of a given faunule that contains specimens in which the tubules can be seen. We have examined material from several localities of Silurian and Devonian age and have observed that the tubules are restricted to a group of genera related to *Phanassymetria*. The tubules can be seen on the inside surface of well-preserved valves. In some cases they appear as perforations through the shell wall of abraded specimens. They may also be seen by transmitted light on wetted specimens of both complete carapaces and dissociated valves. Under some conditions of preservation it is necessary to make thin sections to determine the presence of the tubules. They show very plainly on radiographs of the valves. Examination of van Veen's paratype material from the Cretaceous of Holland fails to show any indication of these tubules, either with transmitted light or on the radiographs. The following translation of the discussion of the genus *Phanassymetria* by van Veen shows that she was not aware of the presence of the tubules in the early Paleozoic species:

> This genus was established by Roth for two Lower Devonian ostracodes from America whose valves, as the name indicates, are distinctly asymmetrical. Their asymmetry consists in one valve being much larger than the other and overlapping it on all the margins.
>
> Roth arbitrarily established the wider end as anterior, thus making the right valve larger. This orientation should very likely be reversed, making the left valve the larger, as is the usual case with ostracodes. This orientation is indicated also by the fact that in *P. quadrupla* the posterior and not the anterior end varies considerably in width. Roth states that in both of his species the hinge of the valve which we consider as the left has a furrow and the right valve is flanged ["scharf"]. On the other hand, we believe that in our two species the opposite is the case, as is usual with other ostracodes.
>
> Roth does not give generic characteristics, but describes in detail his two species. Bassler and Kellett (1934, p. 37) describe the genus in their Bibliographic Index of Paleozoic Ostracodes. They, however, base their description mainly on the genotype. They place this genus in the family Thlipsuridae. The following may be mentioned as the chief characteristics: The carapace is thick and strongly asymmetrical, since the left valve is much larger than the right one, and overlaps it on all the margins. The surface of the valves is smooth or punctate. Hinge margin straight, and hinge teeth absent.
>
> Roth as well as we [van Veen] found two types of forms of this genus. We, therefore, originally concluded that his as well as our specimens represented a species exhibiting strong sexual dimorphism. The illustrations given by Roth do not contradict this assumption; *P. triserrata* would be the female and *P. quadrupla* the male. In order to investigate this problem a sample of Haragan marl from White Mound, Oklahoma, was obtained from Prof. R. W. Harris through the courtesy of Dr. Merle Israelsky to both of whom we express our sincere thanks. The sample contained a great number of complete carapaces and dissociated valves of the two species of *Phanassymetria* differentiated by Roth. We concluded that our assumption is most likely not correct because we believe that we are able to differentiate longer and shorter carapaces in both species ["Gattungen"] with a greater number of shorter ones.
>
> Fossils of this genus were found only in the Lower Devonian of North America and in the Cretaceous of South Limburg, the former being much larger.
>
> It may be mentioned that Bonnema (1932, p. 288; 1933, p. 25) was referring to this genus when he wrote "pot-with-lid."

As may be seen from the above discussion in addition to lacking tubules that are characteristic of *Phanassymetria*, the Cretaceous species differ in being smaller. It might be

considered as a possibility that the small size coupled with the absence of pores in the Cretaceous forms represents an atavistic reversion or a juvenile stage of the *Phanassymetria* stock. That this is not the case is shown by the presence of pores in a juvenile growth stage of *Phanassymetria*, which is about half the size of the adults, from the type locality at White Mound, Oklahoma. This juvenile specimen has a length of 0.5 mm as compared with a length of 0.4 mm for the Cretaceous specimens. It therefore appears that the resemblance between the lower Paleozoic and the Cretaceous species is due to homeomorphy rather than any genetic relationship. Even this resemblance is more apparent than real, however, as the "groove" on *P. foveata* van Veen, which is supposed to resemble that on *P. triserrata* Roth, is actually a shallow subtriangular depression oblique to the hinge line (Fig. 5) rather than a groove open posteriorly and parallel to the hinge line as in the Paleozoic species. The thickness of the shell wall of the Paleozoic specimens appears to be proportionately greater than that of the Cretaceous specimens. In *P. afoveata* van Veen, no pit or groove is present, and the resemblance to the lower Paleozoic forms is in the general outline and in the alleged thickness of the shell walls. Considering these factors, and considering that no species assignable to *Phanassymetria* have been found in either the upper Paleozoic or the lower Mesozoic, it seems desirable to remove the Cretaceous species from the genus *Phanassymetria*.



Figs. 1–3.—1, *Phanassymetria* sp.: Left valve from the inside, camera-lucida drawing, approx. × 66, showing the tubules. Marl beds of Haragan shale west of Clarita, Coal County, Okla., donated by Robert H. Stewart, U. S. Geological Survey, who obtained the sample from Prof. William Shideler, Miami University, Oxford, Ohio, U.S.N.M. no. 116454. 2, *Pseudophanasymmetria foveata* (van Veen): Complete carapace, lateral view of right side, camera-lucida drawing from radiograph, approx. × 113; tubules not present. Van Veen's paratype material, Maestrichtian from South Limburg, Holland, U.S.N.M. no. 108231. 3, *Pseudophanasymmetria? afoveata* (van Veen): Complete carapace, lateral view of right side, camera-lucida drawing from radiograph, approx. × 113; tubules not present. The specimen was tilted when the radiograph was made so that the muscle scar patterns, presumed to be located opposite each other, are projected on the plane of the film as two units. The upper pattern is interpreted to belong to the right valve, and the lower to the left valve. Van Veen's paratype material, Maestrichtian from South Limburg, Holland, U.S.N.M. no. 108232.

Family BAIRDIIDAE? Sars, 1887

Pseudophanasymmetria Sohn and Berdan, n. gen.

Phanassymetria (part) van Veen, Natuurhist. Maandblad, Jaarg. 25, no. 11–12: 177. 1936.

Genotype *P. foveata* (van Veen), ibid.: 177–178, pl. 10, figs. 16–22.

Diagnosis.—Markedly asymmetrical ostracodes with shells not penetrated by conspicuous large pores. Larger valve overlaps smaller on all margins. Hinge straight, simple, reported by van Veen to consist of a bar and groove. Both dorsal and lateral outlines subovate. Shell surface either smooth or punctate, and with a shallow depression on the posterodorsal part of the shell. Inner lamella not observed, probably absent.

Discussion.—The reasons for separating this genus from *Phanassymetria* have been cited above. Van Veen placed two Cretaceous species, *P. foveata* and *P. afoveata*, in *Phanassymetria*. Of these two, *P. foveata* has been selected as the type of the new genus. Van Veen (1936, p. 178) has stated that *P. foveata* and *P. afoveata* resemble each other in having the left valve much larger than the right and overlapping it on all margins, and also in having a small spine on the posterior margin of each valve. These spines are very small, and, according to van Veen, many of them are abraded. As such spines in many ostracode genera are not even of specific importance, the principal indication of relationship between the two species is the similarity in overlap. The species differ in the presence of surface sculpture in *P. foveata* as opposed to *P. afoveata*, and in a well-defined muscle scar in *P. afoveata*, which has not been observed in *P. foveata*. It is, therefore, possible that examination of additional material will show that the two species do not belong to the same genus. However, the material available to us, which consists of a complete carapace and one larger valve of each species, does not justify the proposal of an additional genus. The species *afoveata* is provisionally referred to *Pseudophanasymmetria*. The following species appear similar to *Pseudophanasymmetria? afoveata:*

Bairdia subglobosa Bosquet, 1852, Memoires Couronnes et Memoires des Savants Étrangers publiés par l'Académie Royale des Sciences, des Lettres et des Beaux-arts de Belgique **24:** 25, pl. 1, figs. 7a–d. Cretaceous to Miocene.—Bosquet, 1854, Mon. Crust. foss. Crétacé de Limburg: 65–66 (55–56), pl. 8, figs. 3a–d.

Bairdia subglobosa Méhes, 1911, Resultate der Wissenschaftlichen Erforschung des Balatonsees **3:** pt. 6: 21, pl. 2, figs. 11–13, Triassic.

Bairdia (?) problematica Méhes, 1911 (= *Hungarella problematica* (Mehes)), Resultate der Wissenschaftlichen Erforschung des Balatonsees **3:** pt. 6: 21, pl. 2, figs. 14–18, Triassic.

Bairdia (?) problematica var. *reniformis* Méhes, 1911 (= *Hungarella problematica* var. *reniformis* (Méhes)), Resultate der Wissenschaftlichen Erforschung des Balatonsees **3:** pt. 6: 22–23, pl. 2, figs. 19–23, Triassic.

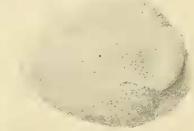
Further study may disclose that the listed species and *Pseudophanasymmetria? afoveata* belong to the same group, and in one or more genera. Bosquet's statement (1854, footnote, explanation to pl. 8) that the specimens described as *B. subglobosa* are young individuals of *B. subdeltoides* is probably not correct, because we have observed growth stages of species of Paleozoic *Bairdia* and of post-Paleozoic *Bairdoppilata* in which the younger stages have the same lateral and dorsal outlines as the adults. The Triassic species referred by Méhes to *Bairdia subglobosa* probably does not belong to it, and may require a new name.

Pseudophanasymmetria foveata (van Veen), 1936

Figs. 2, 4, 5

Phanassymetria foveata van Veen, Natuurhist. Maandblad, Jaarg. 25, no. 11–12: 177–178, pl. 10, figs. 16–22. 1936.

4



5

6

FIGS. 4–6.—4, 5, *Pseudophanasymetria foveata* (van Veen): 4, Left valve from the inside, approx. × 70; anterior ventral portion broke in handling. Van Veen's paratype material, Maestrichtian from South Limburg, Holland, U.S.N.M. no. 108234; 5, complete carapace, dorsal view, approx. × 70; same specimen as shown in Fig. 2. 6, *Pseudophanasymetria ? afoveata* (van Veen). Left valve from the inside approx. × 70. Van Veen's paratype material, Maestrichtian from South Limburg, Holland, U.S.N.M. no. 108233.

A translation of the original description follows:

This species is represented by 4 carapaces and 21 left valves. Right valves are absent, presumably because of their smaller size.

Carapace thick. Egg-shaped in lateral view, greatest height anterior to midlength. Anterior margin broadly rounded. Posterior margin somewhat truncated. Dorsal margin straight, ventral margin slightly convex. These two margins converge strongly backward, dorsal and ventral outline also egg-shaped, greatest width is behind midlength. Lengthwise very irregularly triangular, with greatest width below midhieght so that the carapace is flattened out below.

It is very characteristic that the left valve has a sulcus [Grube] located on the outside in the back below the dorsal margin. The margins of the sulcus are elevated, except along dorsal margin. Strange to say, a similar sulcus is found in *P. triserrata* Roth, but there the elevation is lacking. The surface of the valves is finely punctate, with small dots that are arranged in rows. It is further characteristic that each valve has on its posterior a little spine, which, however, is often abraded. In *P. triserrata* such a spine is present on the dorsal surface of each valve.

This ostracode is present in Staring's third Bryozoa bed in the Jeker Valley, and in the first Bryozoa layer of Maestrichtian "d" at Bemelen.

Measurements (in millimeters):

	Greatest length	*Greatest height*	*Convexity*
Complete carapace	0.44	0.32	0.31
Left valve	0.41	0.29	—

The extremely small size of the specimens suggests that they possibly represent young growth stages. The original of van Veen's figs. 16–20, pl. 10, is here designated as the lectotype.

Pseudophanasymmetria? afoveata (van Veen), 1936

Figs. 3, 6

Phanassymetria afoveata van Veen, Natuurhist. Maandblad, Jaarg. 25, no. 11–12: 178, pl. 10, figs. 23–30. 1936.

A translation of the original description follows:

This ostracode, too, belongs to the less common species, being represented by four complete carapaces, six left valves, and one right valve. The relationship of this ostracode with the previous one results from the fact that the left valve is much larger than the right and overlaps it all around, and that each valve bears a little spine on the posterior margin. It differs from the former by being smaller, less thick, more slender, and more cylindrical in shape. Moreover, the surface is not punctate. Furthermore, the groove on the posterior part is absent.

This species is found in Staring's third Bryozoa bed in the Jeker Valley and in the first Bryozoa bed at Bemelen.

Measurements (in millimeters):

	Greatest length	*Greatest height*	*Convexity*
Complete carapace	0.40	0.26	0.26
Left valve	0.41	0.26	—

The extremely small size of the specimens suggests that they possibly represent young growth stages. A complete carapace and two larger valves were available to us for study, but unfortunately one of the larger valves was destroyed during the process of obtaining radiographs, and a portion of the larger valve of the carapace was broken after a satisfactory radiograph was obtained. The radiograph of the carapace shows muscle scar patterns on both valves (Fig. 3). The pattern is circular and consists of eight discernible scars that differ in arrangement in the opposing valves. It is not known whether this asymmetry in arrangement of the individual muscle fibers is typical in ostracodes. The arrangement of the muscle scar pattern is similar to that of *Hungarella* Méhes (1911, p. 22) as figured by him for *Bairdia(?) problematica* Méhes, 1911, on pl. 2, fig. 16. The small scars that surround the central group in *Hungarella* are not discernible in *P. afoveata*. The original of van Veen's figs. 23–27, pl. 10, is hereby designated as the lectotype.

REFERENCES

BASSLER, R. S., and KELLETT, BETTY. *Bibliographic index of Paleozoic Ostracoda*. Geol. Soc. Amer. Spec. Pap. **1**: 500 pp. 1934.

BONNEMA, J. H. *Orientation of the carapaces of Paleozoic Ostracoda*. Journ. Pal. **6**: 288–295. 1932.

———. *Die Orientierung der Schalen der paleozoischen Ostracoden*. Zeitschr. Geschiebeforsch. **9**, pt. 1: 23–42. 1933.

BOSQUET, J. *Monographie des Crustaces fossiles du terrain Crêtacê du* Duché de Limburg. Memoires de la Commission pour la description et la carte Géologique de la Neerland. **2**: 137 pp., 10 pls. 1854.

KELLETT, BETTY. *Permian ostracodes*. Journ. Pal. **17**: 615–628, 1943.

MÉHES, GYULA. *Über Trias-Ostrakoden aus dem Bakony*. Resultate der wissenschaftl. Erforschung des Balatonsees, Anhang, Paleont. der Umgebung des Balatonsees **3**, pt. 6: 38 pp., 4 pls. 1911.

ROTH, ROBERT. *Some ostracodes from the Haragan marl, Devonian, of Oklahoma*. Journ. Pal. **3**: 327–372, pls. 35–38. 1929.

SWARTZ, F. M. *Revision of the Primitiidae and Beyrichiidae, with new Ostracoda from the*

lower Devonian of Pennsylvania. Journ. Pal. **10:** 541–586, pls. 78–89. 1936.

SYLVESTER-BRADLEY, P. C. *The shell structure of the Ostracoda and its application to their paleontological investigation*. Ann. Mag. Nat. Hist., ser. 11, **8:** 1–33. 1941.

VAN VEEN, J. E. *Nachtrag zu der bis jetzt erschienenen Revision der Ostracoden der Maastrichter Tuffkreide und der Kunrader Korallenkalkes von Süd-Limburg*. Natuurhist. Maandbland, Jaarg. **25,** no. 11–12: 170–188, pls. 9–10. 1936.

PALEONTOLOGY.—*The arms of* Polusocrinus. HARRELL L. STRIMPLE, Bartlesville, Okla. (Communicated by Alfred R. Loeblich, Jr.)

Several months ago, Gregory Elias, of Gulf Oil Corporation, found a specimen of *Polusocrinus* Strimple (1951) with well-preserved arms attached. The specimen was obtained by the author through exchange and provides vital information for the study of ampelocrinids. The specimen was collected in the small excavation about half a mile due west of the school at Ochelata, Okla., in the Wann formation. This zone is also found at the hill, locally termed "The Mound," just west of the city limits of Bartlesville, Okla., where several specimens of the species have been collected by the author. Description is given below as *P. ochelataensis*, n. sp.

Genus **Polusocrinus** Strimple, 1951

There have been some questions raised as to the practicability of the genus *Polusocrinus*. One characteristic, which was not brought out by the author, is the lack of depth of the arm articulating facets found in the genus. In *Aesiocrinus magnificus* Miller and Gurely (1890), the genotype species, and in other typical representatives of that genus, the arm articulating facets attain a depth somewhat greater than the normal thickness of the RR. Typical species also have a shallow basal concavity. *Oklahomacrinus* Moore (1939) has comparable arm articulating facets, but the genus is characterized by extreme basal invagination, quite foreign to the convex base of *Polusocrinus*. The form described as *Moundocrinus osagensis* Strimple (1939) has the same type of arm articulating facets as *Polusocrinus* but the anal plate of that species is only faceted for the reception of a single tube plate, and the IBB circlet is smaller and downflared in attitude. In both *Polusocrinus* and *Aesiocrinus* the anal plate is followed by two tube plates.

With the knowledge afforded by the crown of *P. ochelataensis*, we are able to anticipate from fourteen to sixteen arms in *Polusocrinus*. Most Pennsylvanian genera assigned to the Ampelocrinidae have only ten arms, and one, *Allosocrinus* Strimple (1949), has only five. *Exocrinus* Strimple (1949) has numerous arms, but the author contemplates removal of this genus from the ampelocrinids in the near future.

Polusocrinus ochelataensis, n. sp.

Figs. 1–8

Dorsal cup is full, semiglobular shaped. Five IBB form a large, pentagonal disk, which is shallowly concave about the columnar attachment but is mildly convex in its entirety. Five large BB are hexagonal except for the post. B, and are equally wide as long. Five RR are slightly wider than long and are pentagonal. Articulating facets slope inward and attain a length only 0.7 mm greater than the normal thickness of the RR. One large anal plate is present, resting evenly on the upper truncated extremity of the post. B. It extends only slightly above the upper extremity of the cup and attains its maximum width at the upper level of the cup. There is provision for the reception of two tube plates of equal size.

The entire crown is devoid of ornamentation and the sutures of the cup are not impressed. The column is pentagonal and the lumen is pentalobate. The tegmen has not been observed.

First bifurcation of the arms occurs on the low axillary second primibrachials in all rays. Subsequent branching is known in the left ray of all rami except the r. post. where preservation is not clear enough to be certain. The second secundibrachials are axillary in all left rays with the exception of the anterior where the first SBr is an unusually large axillary plate. The arms are uniserial and are well rounded, appearing not to have reposed in close contact. No branching has been observed in the right rays.

Measurements in mm.—As follows: